$\frac{2}{-1} = \frac{-a}{1} \Rightarrow a = 2$

سوال ۱۱:

سوال ۱ : $y = x^2 + 2x - 2 = 1 \Rightarrow x^2 + 2x - 3 = 0 \begin{cases} x_1 = 1 \\ x_2 = -3 \end{cases}$

سوال ۲ : $y = -(x-1)(x+3) + 1 \Rightarrow -x^2 - 2x + 4 \Rightarrow b = 4$

سوال ۱۲:

$15x^2 + 73x + 14 < 0 \Rightarrow \frac{-14}{3} < x < \frac{-1}{5}$

$\frac{-70}{15} = \frac{14}{3}$ و $\frac{-3}{15} = \frac{-1}{5}$

$\left|\frac{x-1}{2} - 1\right| > 3 \begin{cases} \frac{x-3}{2} > 3 \Rightarrow x > 9 \\ \frac{x-3}{2} < -3 \Rightarrow x < -3 \end{cases}$

$\xrightarrow{\text{اشتراک}}$ $\overset{a}{\frac{-14}{3}} < x < \overset{b}{-3}$

$b - a = -3 + \frac{14}{3} = \frac{5}{3}$

سوال ۱۳:

f ثابت $\Rightarrow m = n = 0 \longrightarrow f(x) = -k$

$(m, n-1) = (0, k) \Rightarrow k = n - 1 = -1$

$\Rightarrow f(k) = 1$

سوال ۱۴:

f همانی $\Rightarrow f(x) = x$

$g(x) = \frac{1}{x-a} \Rightarrow |g(x)| - 2 = \left|\frac{1}{x-a}\right| - 2 = \frac{1}{|x|}$

$\xrightarrow{x = \frac{\sqrt{2}}{2}} \frac{1}{\left|\frac{\sqrt{2}}{2} - a\right|} = \frac{1}{\frac{\sqrt{2}}{2}} + 2 = 2 + \sqrt{2} \Rightarrow \left|\frac{\sqrt{2}}{2} - a\right| = \frac{1}{2+\sqrt{2}} = \frac{2-\sqrt{2}}{2}$

$\begin{cases} \frac{\sqrt{2}}{2} - a = 1 - \frac{\sqrt{2}}{2} \Rightarrow a = \sqrt{2} - 1 \\ \frac{\sqrt{2}}{2} - a = \frac{\sqrt{2}}{2} - 1 \Rightarrow a = 1 \end{cases} \Longrightarrow 1 - \sqrt{2}$

سوال ۱۱۵:

$$\alpha\beta^2+\alpha^2\beta=\alpha\beta^2\cdot\alpha^2\beta \xrightarrow{\div\alpha\beta} \alpha+\beta=\alpha^2\beta^2$$

$$\Rightarrow S=P^2 \Rightarrow \frac{-b}{a}=\left(\frac{c}{a}\right)^2 \Rightarrow a=\frac{-c^2}{b}=\frac{-16}{-8}=2$$

سوال ۱۱۶:

$$\left.\begin{array}{l} 2-x\geq 0 \\ x-2\geq 0 \end{array}\right\} \Rightarrow x=2$$

$$\xrightarrow{\text{جایگذاری}} \sqrt{1}=\sqrt{2}-\sqrt{0} \quad \times$$

جواب ندارد

سوال ۱۱۷:

$$y=(\sqrt{x}-1)^2 \xrightarrow{x\geq 1} \sqrt{y}=\sqrt{x}-1 \Rightarrow \sqrt{x}=\sqrt{y}+1$$

$$g(x)=f^{-1}(x)=(\sqrt{x}+1)^2$$

$$g(g(1))=g(2)=9$$

سوال ۱۱۸:

		0		1	
x	$-$	0	$+$		$+$
$\log x$	$\times$		$+$	0	$-$
f	$\times$		$+$	0	$-$

$$\Rightarrow D_f=(0,1) \xrightarrow{\subseteq}$$

در ۲ هیچ جواب ندارد

سوال ۱۱۹:

$$\frac{\sin\alpha}{\cos\alpha}=2 \Rightarrow \tan\alpha=2 \Rightarrow \cos^2\alpha=\frac{1}{1+\tan^2\alpha}=\frac{1}{5}$$

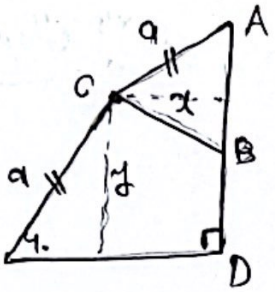
$$\xrightarrow[\text{ربع سوم}]{\cos\alpha<0} \cos\alpha=\frac{-\sqrt{5}}{5}$$

سوال ۱۲۰:

شیب خط $\frac{-2m}{m^2-1}=\tan 60^\circ=\sqrt{3} \Rightarrow \sqrt{3}m^2+2m-\sqrt{3}=0$

$$\hookrightarrow |m_1-m_2|=\frac{\sqrt{\Delta}}{|a|}=\frac{\sqrt{4+12}}{\sqrt{3}}=\frac{4}{\sqrt{3}}$$

سوال ۲۱:



$$\frac{1}{2}\sin 60 \times 48 \times a = 12\sqrt{3} \longrightarrow a = 6$$

$$\begin{cases} x = a\sin 60 = 3\sqrt{3} \\ y = a\sin 60 = 3\sqrt{3} \end{cases} \xrightarrow{\text{مساحه}} S_\Delta = 3\sqrt{3}\sqrt{3} = 3\sqrt{6}$$

سوال ۲۲:

$$\text{اتحاد}: \frac{\cos x}{1+\sin x} = \frac{1-\sin x}{\cos x}$$

$$\text{معادله}: \frac{\cos x}{1+\sin x} = \frac{1+\sin x}{\cos x}$$

$$\Rightarrow \frac{1-\sin x}{\cos x} = \frac{1+\sin x}{\cos x}$$

$$\sin x = 0$$

$$x = k\pi$$

$\pi =$ انتهای

سوال ۲۳:

$$\log_n^m = a \Longrightarrow \frac{\log m}{\log n} = a$$

$$b = \log_{mn}^{m^2 n} = \frac{2\log m + \log n}{\log m + \log n} = \frac{2a+1}{a+1} = 1 + \frac{a}{a+1} = 1.\ldots \longrightarrow [b] = 1$$

سوال ۲۴:

6 تایی

۴ مثال

$$\Longrightarrow \text{حداکثر } \bar{x} \to 94, 94, 94 : \bar{x} = 94$$

$$\sigma^2 = \frac{2^2 + 0^2 + 2^2}{3} = \frac{8}{3}$$

$$CV_{min} = \frac{\sigma}{\bar{x}} = \frac{\frac{2\sqrt{2}}{\sqrt{3}}}{94} = \frac{\sqrt{2}}{48\sqrt{3}} = \frac{1}{24\sqrt{6}}$$

سوال ۲۵:

$$\text{ریشه} = 1 \Longrightarrow 5 - a + b = 0 \longrightarrow a - b = 5$$

$$\text{ریشه مضاعف} = 1 \Longrightarrow 1 + a + b = 0 \longrightarrow a + b = -1 \Longrightarrow \begin{cases} a = 2 \\ b = -3 \end{cases}$$

$$\left[\frac{b - 2a}{3}\right] = \left[\frac{-3-4}{3}\right] = -3$$

سوال ۱۲۶:

$x=1$ پیوستگی : $\tan\frac{3\pi}{4} = \lim_{x\to 1} \frac{x^2+x-2}{a(1-x)} \Rightarrow \frac{-3}{a} = -1 \Rightarrow a=3$

$x=5$ پیوستگی : $\frac{28}{3\times(-4)} = b(5-(-5)) \Longrightarrow 10b = \frac{-7}{3} \Rightarrow b = \frac{-7}{30}$

$ab = \frac{-7}{10} = -0.7$

سوال ۱۲۷:

$a\cos\frac{\pi}{3} - \sin\frac{\pi}{3} = 0 \Longrightarrow \frac{a}{2} = \frac{\sqrt{3}}{2} \Rightarrow a=\sqrt{3}$

$\boxed{\text{۵ مثبت}}$

>0 مماس

$\hookrightarrow \sqrt{3}\frac{\pi}{3} + b > 0 \Rightarrow b > \frac{-\pi}{\sqrt{3}} = -1.\ldots$

-1 = حداقل مقدار صحیح b

سوال ۱۲۸:

$f'(x) = \frac{1}{2\sqrt{x}} + \frac{-2}{2\sqrt{a-2x}} = 0 \Rightarrow \sqrt{a-2x} = \sqrt{x}$

$a-2x = 3x \Rightarrow x = \frac{a}{5}$

$f(\frac{a}{5}) = \sqrt{\frac{a}{5}} + \sqrt{\frac{2a}{3}} = \frac{3}{\sqrt{5}}\sqrt{a}$

$f(0) = \sqrt{a}$

$f(\frac{a}{2}) = \sqrt{\frac{a}{2}}$

$\frac{3}{\sqrt{15}}a = \sqrt{15} \Rightarrow a = 5$

سوال ۱۲۹:

$d: y = -\frac{1}{2}x + \frac{9}{2}$

$g(x) = \sqrt[3]{x}\left(\frac{-x}{2} + \frac{9}{2}\right) = -\frac{x^{\frac{4}{3}}}{2} + \frac{9}{2}x^{\frac{1}{3}} \Rightarrow g'(x) = -\frac{4}{3}x^{\frac{1}{3}} + \frac{3}{2}x^{-\frac{2}{3}}$

$\xrightarrow{x=-1} \frac{4}{3} + \frac{3}{2} = \frac{17}{6}$

سوال ۱۳۰:

$P(\text{عدد مضرب } 10) = \frac{1}{n} \Rightarrow n = 15$

$P = \frac{10}{15} \times \frac{9}{14} \times \frac{8}{13} = \frac{15}{91}$

سوال ۱۳۱:

A: تیپ سالم

B: قهرمانی

$\Rightarrow \begin{cases} P(A) = \frac{1}{5} \\ P(B) = \frac{1}{3} \\ P(B|A) = \frac{1}{2} \end{cases} \Rightarrow P(A \cap B) = \frac{1}{3} \times \frac{1}{5} = \frac{1}{15}$

$P(A \cup B) = \frac{1}{5} + \frac{1}{3} - \frac{1}{15} = \frac{9+15-3}{30} = \frac{21}{30}$

سوال ۱۳۲:

$P = \frac{16}{45} \times \frac{4}{16} + \frac{15}{45} + \frac{9}{15} + \frac{14}{45} \times \frac{6}{14} = \frac{4+9+5}{45} = \frac{1}{3}$

سوال ۱۳۳:

$\overset{\triangle}{ADE} \sim \overset{\triangle}{ABC} \Rightarrow \frac{AD}{AB} = \frac{AE}{AC}$

$\frac{1}{x-1} = \frac{x}{15} \Rightarrow x(x-1) = 15 \Rightarrow x = 5$

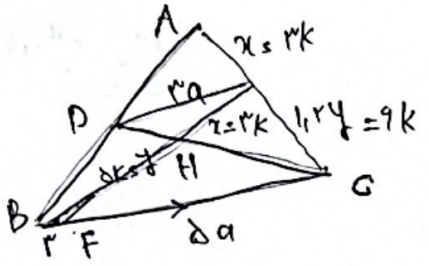
سوال ۱۳۴:

موازی: $a = \frac{1}{a} \Rightarrow a^2 = 1$

$\begin{cases} a = 1 : y = x , y = x-1 \ \checkmark \quad (1, 2) \\ a = -1 : y = -x+2 , y = -x-1 \ \times \end{cases}$

$\begin{cases} \text{عرض} = \frac{1}{\sqrt{2}} \\ \text{طول} = 5 \end{cases} \Rightarrow \text{طول} = \sqrt{25 - \frac{1}{2}} = \frac{7}{\sqrt{2}} \Rightarrow \text{مساحت} = \frac{7}{\sqrt{2}} \times \frac{1}{\sqrt{2}} = 25$

سوال ۳۵:



$x = 3k$

$y = 5k$

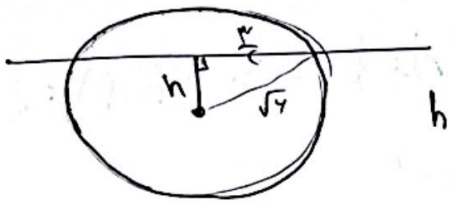
$$\frac{3a}{3+5a} = \frac{3k}{9k} = \frac{1}{3}$$

$$\Rightarrow a = \frac{3}{4} = 0.75$$

$$\Rightarrow BC = 6.75$$

سوال ۳۶:

$$\begin{cases} O(2,-1) \\ R = \sqrt{6} \end{cases}$$



$$h = \sqrt{6 - \frac{9}{4}} = \frac{\sqrt{15}}{2}$$

$$\frac{|-2+3-a|}{\sqrt{2^2+1^2}} = \frac{\sqrt{15}}{3} \Rightarrow |a| = \frac{5\sqrt{3}}{3} \Rightarrow a = \pm\frac{5\sqrt{3}}{2}$$

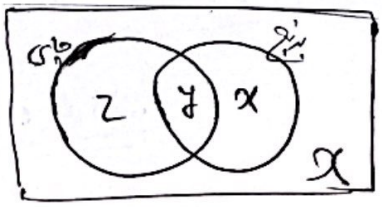
تفاضل $= 5\sqrt{3}$

سوال ۳۷:

$$a^{\frac{1}{7}} = 27a^{\frac{15}{7}} \Rightarrow 27a^2 = 1 \Rightarrow \frac{1}{a} = 3\sqrt{3}$$

$$\frac{3\sqrt{3}-3}{1+\sqrt{3}} \times \frac{\sqrt{3}-1}{\sqrt{3}-1} = \frac{3(\sqrt{3}-1)^2}{2} = \frac{3(4-2\sqrt{3})}{2} = 6-3\sqrt{3}$$

سوال ۳۸:



$$x + y = 200$$

$$\left.\begin{array}{l} 2x + y + z = 500 \\ y + z = 370 \end{array}\right\} \quad \begin{array}{l} 3x = 130 \\ x = 65 \end{array}$$

$$\Rightarrow y = 200 - 65 = 135 \qquad \Rightarrow z = 370 - 135 = 235$$

سوال ۳۹:

$$\begin{cases} 4a = 3c \\ 8a = 7b \end{cases} + 4d \quad + 8d' \qquad \begin{cases} b = 0 \\ \end{cases} + 4d \quad + 8d'$$

$$d_1 = d_2$$

سوال ۵۰۴۰

$$8^{-\frac{2}{3}m} \times 2^{-n} + 2^{-m} \times 8^{-\frac{2}{3}m} > \frac{1}{128}$$

$$\Rightarrow 2^{-2m-2m} + 2^{-2m-2n} > 2^{-7} \Rightarrow 2^{-2m-2n} > 2^{-8}$$

$$\Rightarrow -2m-2n > -8 \Rightarrow m+n < 4 \xrightarrow[max]{N} m^3+n^2 = 2^3+1^2 = 9$$

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